

Proc Mixed, Proc Nlin, Proc Nlinmix: Failure to Converge

When you introduced repeated measures and alternate covariance structures for an analysis, not all Proc Mixed analyses will converge using the default settings. There is no simple remedy. The following are suggestions which may help you achieve convergence in an analysis.

1. Temporarily turn off the repeated statement (eg. Put an asterisk * at the beginning of the line) and run the model & check the output. This ensures that the rest of the model & statements are error free.
2. Check that the repeated subject has been specified properly. Make sure that the levels of the repeated effect are different for each observation within a subject. Instead of using an id variable, explicitly indicate what is the repeated subject (Eg. Sub=Block*treatment).
3. If you are using a repeated statement, check if convergence is possible under *type=vc* (the default). Problems in convergence often arise when using more complex variance/covariance structures. For many datasets, an unstructured model (*type=un*) is often the most difficult to achieve convergence.

Options to try in the Proc Mixed statement.

4. ITDETAILS This option generates the information at each stage of the iteration process. This may help you identify what is happening.
5. SCORING Use the *scoring= 10* option. Try increasing the scoring value.
6. MAXITER Increase the number of iterations. (*maxiter= 100*) or more in case you need more than the default of 50.
7. CONVH Reduce the convergence criterion (eg. *convh=1e-06*) from the default of 1e-08.
8. Transforming (rescaling)

If the covariance parameters are on quite different scales (orders of magnitude differences here), or even the dependent variable has quite a wide range, then transforming (eg. Ln scale) may help.

Also, lack of convergence may also be due to a violation of the normality assumption. Again, transformation may be helpful.

9. Infinite likelihood.

This indicates that the algorithm has stepped into a region where the matrix is nonpositive definite. If iterations do not continue, then you could try altering the constraints on the Newton-Raphson algorithm. These constraints are that variances are non-negative, and the autoregressive parameters are constrained to be -1 to +1.

Try adding the NOBOUND option to relax this constraint. *But, be wary, this may give unusual results.*

10. Try a different method for estimating the covariance parameters.

Method=REML is the default. Other methods include ML and MIVQUE0. Again, be wary of unusual results.

11. Estimated G matrix not positive definite.

This usually indicates that one or more variance components of the Random statement is zero. Those terms could be removed from the model.